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EXAMINER	
HO, TU TU V	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/631,027	DRY, JOEL M.	
	Examiner	Art Unit	
	Tu-Tu Ho	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-33,35-54 and 56-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-33,35-54 and 56-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. As correctly quoted by Applicant, the examiner ordinarily should reject each claim on all valid grounds available, and piecemeal prosecution should be avoided as much as possible. In the instant case, at least one valid ground such as flowing fluid contained by an elongate thermally conductive member was not publicly available until Feb. 01, 2005, well after the first action on the merit; and certain limitation, for example, "carried on an outer surface", might carry different interpretations when examined in light of different disclosures such as as-filed Fig. 6 and Fig. 6 filed 08/19/2006, for example.

2. Applicant's arguments with respect to claims 1-12,17-19,22-33,38-40,43-54 and 59-61, filed 08/19/2006, have been fully considered but they are not persuasive; Applicant's arguments with respect to claims 14-16, 20-21, 35-37, 41-42, 56-58, and 62-63, filed 08/19/2006, have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 1-5, 7-11, 17-18, 22-26, 28-32, 38-39, 43-47, 49-53, 59, and 60** are rejected under 35 U.S.C. 102(b) as being anticipated by Arndt et al. U.S. Patent 6,848,819 (the '819 reference, cited in a previous office action).

The '819 reference discloses in the figures and respective portions of the specification a light source and a radiation emitting source as claimed.

Referring to **claim 1**, the reference discloses a light source comprising:

an elongate thermally conductive member (generally indicated at 3/1, the "tubularly shaped, cylindrical, hollow cooling member 3" and the flexible printed circuit board (PCB) 1 that wraps around member 3, Fig. 2B, col. 3, line 55, through col. 4, line 61, particularly col. 4, lines 1-23 and lines 41-61, "elongate" is broadly interpreted, and so are "member" and all other terms in all the claims hereinafter, and note that "thermally conductive member" does not require the entirety of the member to be conductive) having an outer surface;

at least one solid-state light source (2, "LED", col. 3, lines 55-60, col. 1, lines 5-10) carried on said elongate member outer surface (Fig. 2B);

one or more electrical conductors (electrical conductors, not shown, col. 3, lines 1-17) carried by said elongate member and connected to said at least one solid-state light source to supply electrical power thereto; and

said elongate thermally conductive member being configured to conduct heat away from said at least one solid-state light source to fluid contained by said elongate thermally conductive member (col. 4, lines 41-61).

Referring to **claim 2** and using the same reference characters, interpretations, and citations as detailed above for claim 1 where applicable, the reference discloses a light source comprising:

an elongate thermally conductive member having an outer surface;

a plurality of solid state light sources carried on said elongate member outer surface at least some of said solid state light sources being disposed in a first plane and others of said solid state light sources being disposed in a second plane not coextensive with said first plane (of the not-shown three-dimension view of the tubularly shaped, cylindrical, hollow cooling member 3/1, whose cross-section view is depicted in Fig. 2B);

electrical conductors carried by said elongate thermally conductive member and connected to said plurality of solid state light sources to supply electrical power thereto; and

said elongate thermally conductive member being configured to conduct heat away from said solid state light sources to fluid contained by said elongate thermally conductive member.

Referring to **claim 22** and using the same references, citations, and interpretations as detailed above for claim 1 where applicable, the reference discloses a radiation emitting source comprising:

an elongate thermally conductive member having an outer surface;

at least one radiation emitting semiconductor device (light emitting diode (LED) 2, as light is a form of radiation, and as LED devices comprised semiconductor materials at the time the reference was disclosed) carried on said elongate member outer surface;

one or more electrical conductors carried by said elongate thermally conductive member and connected to said at least one radiation emitting semiconductor device to supply electrical power thereto; and

said elongate thermally conductive member being configured to conduct heat away from said at least one radiation emitting semiconductor device to fluid contained by said elongate thermally conductive member.

Referring to **claim 23** and using the same references, citations, and interpretations as detailed above for claims 1-2 and 22 where applicable, the reference discloses a radiation emitting source comprising:

an elongate thermally conductive member having an outer surface;

a plurality of radiation emitting semiconductor devices carried on said elongate member outer surface at least some of said radiation emitting semiconductor devices being disposed in a first plane and others of said radiation emitting semiconductor devices being disposed in a second plane not coextensive with said first plane;

electrical conductors carried by said elongate thermally conductive member and connected to said plurality of radiation emitting semiconductor devices to supply electrical power thereto; and

said elongate thermally conductive member being configured to conduct heat away from said radiation emitting semiconductor devices to fluid contained by said elongate thermally conductive member.

Referring to **claim 43** and using the same references, citations, and interpretations as detailed above for claim 1 where applicable, the reference discloses a radiation emitting source comprising:

an elongate thermally conductive member having an outer surface;

at least one radiation emitting solid state device (light emitting diode (LED) 2, as light is a form of radiation and as LED devices were solid state devices at the time the reference was disclosed) carried on said elongate member outer surface;

one or more electrical conductors carried by said elongate thermally conductive member and connected to said at least one radiation emitting solid state device to supply electrical power thereto; and

said elongate thermally conductive member being configured to conduct heat away from said at least one radiation emitting solid state device to fluid contained by said elongate thermally conductive member.

Referring to **claim 44** and using the same references, citations, and interpretations as detailed above for claims 1-2 and 43 where applicable, the reference discloses a radiation emitting source comprising:

an elongate thermally conductive member having an outer surface;

a plurality of radiation emitting solid state devices carried on said elongate member outer surface at least some of said radiation emitting solid state devices being disposed in a first plane and others of said radiation emitting solid state devices being disposed in a second plane not coextensive with said first plane;

electrical conductors carried by said elongate thermally conductive member and connected to said plurality of radiation emitting solid state devices to supply electrical power thereto; and

said elongate thermally conductive member being configured to conduct heat away from said radiation emitting solid state devices to fluid contained by said elongate thermally conductive member.

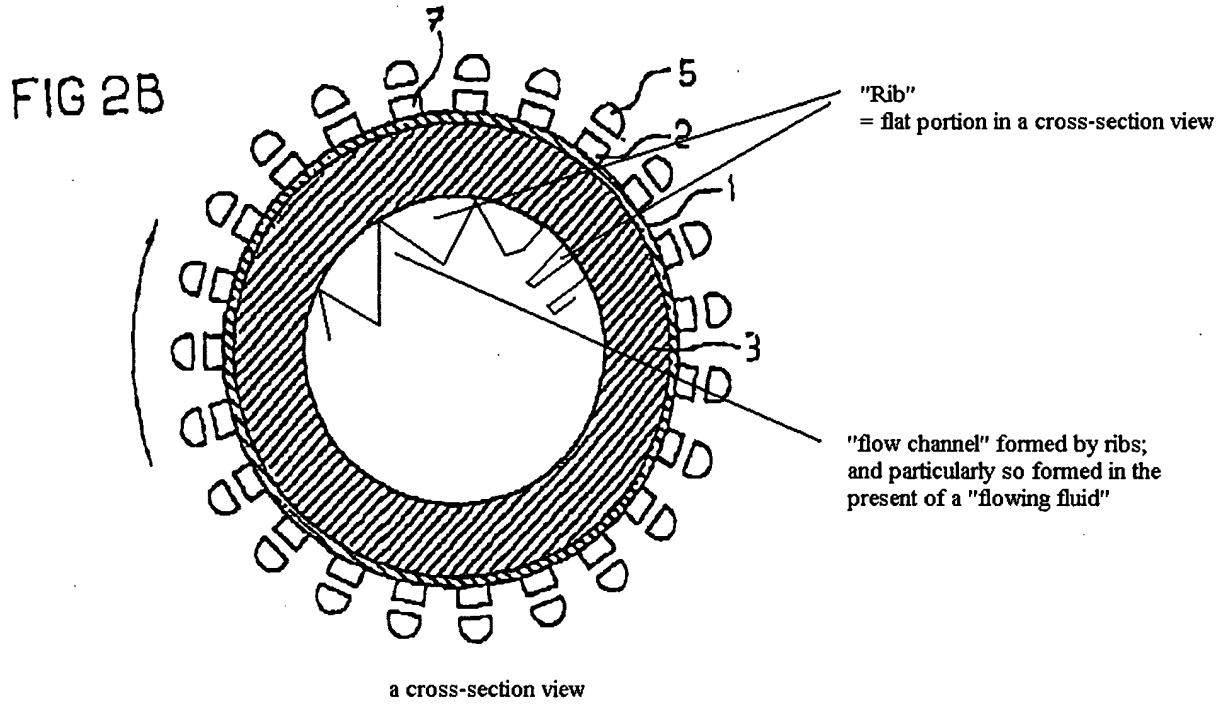
Referring to **claims 3, 17, 24, 38, 45, and 59**, the reference further discloses that said fluid comprises air (col. 4, lines 55-61), which is a thermal transfer media, as is known in the art.

Referring to **claims 4, 25, and 46; and 9, 10, 30, 31, 51, and 52**, the reference further discloses that said elongate thermally conductive member (3) comprises one or more heat dissipation protrusions or extrusions ("cooling ribs and/or a rough surface", col. 2, lines 55-62), and further discloses that said extrusion (extruded portions - ribs) is an aluminum extrusion (because said extrusion is formed from said elongated thermally conductive member 3, which is formed of aluminum – col. 4, lines 5-9).

Referring to **claims 5, 26, and 47**, the reference further discloses that said elongate thermally conductive member comprises a tube (col.4, lines 45-50).

Referring to **claims 11, 32, and 53**, the reference further discloses that said elongate thermally conductive member is a tubular member (col.4, lines 45-50).

Referring to **claims 7, 28, and 49**, the reference further discloses that said tube (comprising cooling member 3, thermally conductive adhesive 6, good-thermal conductive layer 4, and cooling ribs and/or other suitable surface structures, as detailed above) have a cross-section having flat portions (best to be compared with Fig. 5 of the present invention), at least from the ribs (Fig. 2B, reproduced below or next page).



Referring to **claims 8, 18, 29, 39, 50, and 60**, the '819 reference discloses a light source and a radiation emitting source substantially as claimed and as detailed above including said elongate thermally conductive member comprising said thermal transfer media and said cooling ribs. The reference further discloses that said thermal transfer media can flow through said elongate thermally conductive member (col. 4, lines 55-61). Although the reference does not explicitly disclose that said elongate thermally conductive member comprises a flow channel for said thermal transfer media, at least the ribs and/or the tube itself is a flow channel when said flowing fluid flows through it.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. **Claims 6,12,19,27,33,40,48,54, and 61** are rejected under 35 U.S.C. §103(a) as being unpatentable over Arndt et al. U.S. Patent 6,848,819 (the '819 reference, cited in a previous office action).

Referring to **claims 6, 12, 27, 33, 48, and 54**, the '819 reference discloses a light source and a radiation emitting source substantially as claimed and as detailed above. The reference further discloses, also as detailed above, that said elongate thermally conductive member comprises a tube. The reference further discloses that said elongate thermally conductive member has a cross-section in the shape of a circle (Fig. 2B). Although the reference does not disclose that the shape could be a polygon or a triangular, the shape differences are considered obvious and are not patentable unless unobvious or unexpected results are obtained from these changes.

Referring to **claims 19, 40, and 61**, the reference discloses a device as claimed and as detailed above including said elongated thermally conductive member, and further discloses that said elongated thermally conductive member is housed in a fixture (not shown). The reference, however, does not disclose using a clip (securing device, for mounting said elongate thermally conductive member in the fixture) as claimed. Nevertheless, the various securing devices were just different configurations one of ordinary skill in the art would find obvious for mounting or securing said elongate thermally conductive member into said fixture, and therefore such selecting of securing devices would have been obvious to one of ordinary skill in the art at the time the invention was made.

5. **Claims 1-2, 14-16, 20-23, 35-37, 41-44, 51-54, 56-58, and 62-63** are rejected under 35 U.S.C. §103(a) as being unpatentable over Arndt et al. U.S. Patent 6,848,819 (the '819 reference, cited in a previous office action) in view of Bohler al. U.S. Patent 6,799,864 (cited by Applicant) and as evident by Roberts et al. U.S. Patent Application Publication 20020149312.

Referring to **claims 14-16, 20-21, 35-37, 41-42, 56-58, and 62-63; and claims 1-2, 14-16, 20-23, 35-37, 41-44, 51-54, 56-58, and 62-63**, the '819 reference discloses a light source and a radiation emitting source substantially as claimed including: an elongate thermally conductive member ("tubularly shaped, cylindrical, hollow cooling member 3", Fig. 2B, col. 3, line 55, through col. 4, line 61, particularly col. 4, lines 1-23 and lines 41-61, "elongate" is broadly interpreted) for carrying a flexible printed circuit (flex PCB 1, which includes a metal-core copper layer 4) or an electrically insulating layer (1) which in turn carries a plurality of solid state light sources (2) instead of: an elongate thermally conductive member (101, present invention, for ease of comparison) for carrying a flexible printed circuit (131/129) or an electrically insulating layer (131) carrying electrical conductors (129) and for carrying a plurality of solid state light sources (109) via apertures (134) formed in the flexible printed circuit (131/129) or the electrically insulating layer (131) as claimed. In other words, the difference between the reference and the claims is the technique for mounting the various solid state light sources (2, the '819 reference; or 109, the present invention) on an elongate thermally conductive member (tube 3; or 101):

reference: surface-mounting solid state light sources (LED 2) on metal-clad flex PCB (1) on elongate thermally conductive member (3); and

claims: surface-mounting solid state light sources (LED 109) on elongate thermally conductive member (101) via through holes in flex PCB 131/129.

Nevertheless, Bohler, in also disclosing a light source and a radiation emitting source, and in particular in the same effort to reduce heat from operating solid state light sources, teaches that surface-mounting solid state light sources (100) on elongate thermally conductive member ("thermally conductive spreader" slug 110/ "thermally conductive core" fins 64', Fig. 3, cols. 1-4, particularly col. 4, lines 1-25) via through-holes (122) in PCB 120 allows for utilizing high-power solid-state LED's.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, not at the time of the '819 reference, to form the '819 reference's device utilizing surface-mounting high-power solid state light sources (LED 2' hereinafter) on elongate thermally conductive member (3) via through holes in flex PCB (1) rather than surface-mounting solid state light sources (LED 2) on metal-clad flex PCB (1) on elongate thermally conductive member (3). One would have been motivated to make such a change in view of the teachings in Bohler that such a change allows for utilizing high-power solid-state LED's, which were available at the time the invention was made, and wherein a motivation for using high-power solid-state LED's is that high-power solid-state LED's produce better light radiation as was known and as evident by Roberts et al. U.S. Patent Application Publication 20020149312, paragraph [0016]. In doing such modification, one might find that it may be necessary to further mechanically modify the contact points where the high-power solid-state LED's 2' are to be in contact with the appear-to-be perfect cylindrical shape of the tubularly shaped, cylindrical, hollow cooling member 3 of the '819 reference and/or to utilize thermally conductive grease to

surface-mount the modified and available-at-the-time-the-invention-was-made high-power solid-state light sources (LED 2') on said elongate thermally conductive member (3), and that further modification, if required at all, would be obvious because (i) the present form of the unmodified PCB also has an appear-to-be perfect cylindrical shape, (ii) such further modification of shapes and sizes and/or using thermally conductive grease are within routine skills in the art, and (iii) as evident by claims 5, 11, 26, 32, 47, and 53 of the present claimed inventions.

In details in and in claim language, such a modification would result in, in re **claims 1-2, 22-23, and 43-44**:

a light source comprising:

an elongate thermally conductive member (3, the '819 reference, col. 3, line 55, through col. 4, line 61, particularly col. 4, lines 1-23 and lines 41-61) having an outer surface;

a plurality of solid state light sources (2') or a plurality of radiation emitting semiconductor devices (2') or a plurality of radiation emitting solid state devices (2') carried on said elongate member outer surface (via through holes or apertures modified through flex PCB 1 as taught by Bohler for advantages detailed above) at least some of said solid state light sources (2') or said radiation emitting semiconductor devices (2') or said radiation emitting solid state devices (2') being disposed in a first plane and others of said solid state light sources (2') or said radiation emitting semiconductor devices (2') or said radiation emitting solid state devices (2') being disposed in a second plane not coextensive with said first plane (of the not-shown three-dimension view of the tubularly shaped, cylindrical, hollow cooling member 3, whose cross-section view is depicted in Fig. 2B);

electrical conductors (electrical conductors, not shown, col. 3, lines 1-17) carried by said elongate thermally conductive member and connected to said plurality of solid state light sources (2') or said plurality of radiation emitting semiconductor devices (2') or said plurality of radiation emitting solid state devices (2') to supply electrical power thereto;

said elongate thermally conductive member being configured to conduct heat away from said solid state light sources (2') or said radiation emitting semiconductor devices (2') or said radiation emitting solid state devices (2') to fluid contained by said elongate thermally conductive member (col. 4, lines 41-61);

and either, in re **claims 14-16 and 35-37**:

a flexible circuit (flexible printed circuit board (PCB) 1, col. 4, lines 1-10) carried on a surface of said elongate thermally conductive member (3), said flexible circuit comprising said electrical conductors;

wherein said flexible circuit comprises a plurality of apertures (modified in view of Bohler as detailed above) for receiving said plurality of light emitting diodes or said plurality of radiation emitting semiconductor devices, and

each of said solid state light sources or said radiation emitting semiconductor devices is disposed in a corresponding one of said apertures and affixed in thermally conductive contact with said elongate thermally conductive member (as taught by Bohler, as detailed above and in particular col. 1, lines 50-60);

or, in re **claims 51-54 and 56-58**:

wherein said elongate thermally conductive member (3) comprises an extrusion ("cooling ribs and/or a rough surface", col. 2, lines 55-62),

said extrusion is an aluminum extrusion (because said extrusion is formed from said elongated thermally conductive member 3, which is formed of aluminum – col. 4, lines 5-9),

said elongate thermally conductive member (3) is a tubular member ("tubularly shaped, cylindrical, hollow cooling member 3"), and

said tubular member has a circular cross-section (Fig. 2B), but would be obvious to be changed to a polygon cross-section as claimed because the shape differences are considered obvious and are not patentable unless unobvious or unexpected results are obtained from these changes; and

a flexible circuit (flexible printed circuit board (PCB) 1, col. 4, lines 1-10) carried on a surface of said elongate thermally conductive member (3), said flexible circuit comprising said electrical conductors;

wherein said flexible circuit comprises a plurality of apertures (modified in view of Bohler as detailed above) for receiving said plurality of radiation emitting solid state devices, and

each of said radiation emitting solid state devices is disposed in a corresponding one of said apertures and affixed in thermally conductive contact with said elongate thermally conductive member (as taught by Bohler, as detailed above and in particular col. 1, lines 50-60);

or, in re **claim 20-21, 41-42, and 62-63**:

an electrically insulating layer (flex PCB 1) disposed on said elongate thermally conductive member outer surface and carrying said electrical conductors thereon,

wherein said electrically insulating layer comprises a plurality of apertures (modified in view of Bohler as detailed above), each aperture receiving one of said solid state light sources

(2') or said radiation emitting semiconductor devices (2') or said radiation emitting solid state devices (2'); and

each solid state light source of said plurality of solid state light sources or each radiation emitting semiconductor device of said plurality of radiation emitting semiconductor devices or each radiation emitting solid state device of said plurality of radiation emitting solid state devices being mounted in a corresponding one of said apertures and in thermally conductive contact with said elongate thermally conductive member (as taught by Bohler, as detailed above and in particular col. 1, lines 50-60).

Response to Arguments

6. In response to applicant's argument that Fig. 2B (of the '819 reference) does not show an elongate structure (page 25), it is respectfully pointed out that the rejection does not rely solely on Fig. 2B ("(generally indicated at 3/1, the "tubularly shaped, cylindrical, hollow cooling member 3" and the flexible printed circuit board (PCB) 1 that wraps around member 3, Fig. 2B, col. 3, line 55, through col. 4, line 61, particularly col. 4, lines 1-23 and lines 41-61, "elongate" is broadly interpreted and so are "member" and all other terms in all the claims hereinafter, and note that "thermally conductive member" does not require the entirety of the member to be conductive)"). While Fig. 2B does not show an elongate structure, col. 4, lines 41-61 discloses:

"The exemplary embodiment of FIG. 2B shows an axial cross-section through a rotating light of a type that can, be employed in emergency vehicles, for example. For the rotating light of FIG. 2B, the flex board 1 is provided with an array of LEDs 2 is laminated around a tubularly shaped, cylindrical, hollow

cooling member 3"

and as such, the tubularly shaped, cylindrical, hollow cooling member 3, together with the flexible printed circuit board (PCB) 1 that wraps around the tube 3 constitutes the elongate member. As correctly quoted by Applicant, "elongate" is something "extended" (page 24), the cross-section view of Fig. 2B must be extended to be(come) the tube; furthermore, if one were to interpret "elongate" using only the narrow meaning "having more length than width" as quoted by Applicant, one of ordinary skill in the art would find it hard to accept that the tube 3/1, having an infinite combinations of various lengths and widths and only a few occurrence of length = width, not having more length than width. As for the limitation "member", member is a distinct part of a whole or a structural unit such as a limb, a wall, or a beam, each of which comprises other members.

mem•ber

pronunciation
n.

1. A distinct part of a whole, especially:.
a. *Linguistics.* A syntactic unit of a sentence; a clause.
b. *Logic.* A proposition of a syllogism.
c. *Mathematics.* An element in a set.
2. A part or an organ of a human or animal body, as:.
a. A limb, such as an arm or a leg.
b. The penis.
3. A part of a plant.
4. One that belongs to a group or an organization: *a club member; a bank that is a member of the FDIC.*
5. *Mathematics.* The expression on either side of an equality sign.
6. A structural unit, such as a beam or wall.
[Middle English *membre*, from Old French, from Latin *membrum.*]

The American Heritage Dictionary of the English Language, © Houghton Mifflin Company 2003

APA | MLA | Chicago : **Citing this entry**
member. The American Heritage® Dictionary of the English Language (2003). Retrieved 27 October 2006, from xreferplus. http://www.xreferplus.com/entry/4107983

In addition, Applicant argued that PCB 1 is a thermally non-conductive member (page 25); however, the examiner can not find any teachings in the reference that expressly discloses that PCB 1 is thermally non-conductive. Furthermore, normal language usage allows for

expressions such as "a white house" or "a white car", wherein the white house or the white car is characterized in that they are white and do not require, in any practical meaning, that the entire house or the entire car be white; in the instant case, the member 3/1 comprises member 3 which is the bulk of the member 3/1 and which is thermally conductive, therefore member 3/1 is characterized in that it is thermally conductive and therefore it is a thermally conductive member. In addition, as taught in reference U in the Notice of Reference Cited mailed 07/27/2005, all listed-and-known materials, including the so-called insulators, inherently possess some degree of thermal conductivity. Furthermore, the '819 reference teaches "As desired, the cylindrical cooling member 3 can also have a gas, such as air or a liquid coolant, flowing through it for further improvement of the heat elimination" (col. 4, lines 59+), and as such, said PCB 1 must be thermally conductive to conduct thermal energy from LED 7 to the inside of said tube 3 for the device to function as taught.

Therefore, the reference anticipates "an elongate thermally conductive member having an outer surface; at least one solid-state light source carried on said elongate member outer surface" as claimed.

7. With respect to the argument that the examiner rejected claims 7, 28, and 49 using unfounded sheer speculation (page 27), it is respectfully pointed out that the examiner rejects claims 7, 28, and 49 using factual bases based upon the reference's teachings, as detailed above. The same remark could be made to the arguments (page 27) to claims 8, 18, 29, 39, 50, and 60; and furthermore, even without the channels formed by "ribs" and/or "other suitable surface structure or roughening" (col. 4, lines 17+) - particularly so in the present of a flowing fluid such

as air or a liquid coolant (col. 4, lines 55-67) flowing through the tube ("flowing through it") - at least in the present of a flowing fluid, the tube, which is hallow, itself is a flow channel.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 7:30 am - 6:00 pm, Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tu-Tu Ho
October 26, 2006